

reference to *any* other direction—the other theorems, common perpendicularity, equality of alternate angles, &c., are easily deduced.

I was pleased to read Dr. Richardson's letter, as it showed that others were working in the same direction as myself. Part of my time is devoted to teaching mathematics at the School of Mines in this town. This technical institution is attended in the evening by students who during the day are serving their apprenticeship in mechanical workshops. Although geometry is a subject which readily appeals to them, I have learnt the futility of presenting it to them under the garb of Euclid. Even if they had the courage to face the schoolboy's drilling in Euclid, I could not conscientiously ask them to devote their energies to a labour so unrewarding. I, for one, hope that Prof. Perry's efforts to harmonise the teaching of geometry and other branches of mathematics with the needs of engineering students will bear fruit, and that before the lapse of any considerable time.

W. R. JAMIESON.

Gawler, South Australia, August 27.

Symbol for Partial Differentiation.

DR. MUIR'S symbols (p. 520) may be very suitable for manuscripts or the blackboard, but the expense of printing them would be prohibitive. No book in which such symbols were used to any extent could possibly pay. On the other hand, the symbol (dE/dv) , can always be introduced into a paragraph of letter-press without using a justification or a vinculum; and this very much lessens the expense of printing.

A. B. BASSET.

Fledborough Hall, Holypot, Berks, September 26.

Bipedal Locomotion in Lizards.

I HAVE recently observed bipedal locomotion (p. 551) in the case of *Calotes versicolor* in similar circumstances to those noted by Mr. Ernest Green, and have reason to believe that it also occurs in the case of several other Agamoid lizards that I have watched in the Malay Peninsula, though their movements are too rapid to admit of certainty. *Lioplepis bellii*, however, certainly uses all four legs when in rapid motion, holding its tail in the air.

N. ANNANDALE.

Lochbuie, Isle of Mull, N.B., September 25.

A Possible Meteor Shower on October 4.

ON Saturday last, October 4, at 7.45 p.m., I noticed the following phenomenon:—The sky was clouded entirely, when, happening to look to the west-north-west, I saw a well-defined streak of light, starting on a level with some trees in a small wood and moving roughly horizontally towards the south for an angular distance of about 30° . This was followed at about 3-second intervals by another and another, until I counted 43 of them. After this the interval became greater, and about 8 o'clock the phenomenon ceased. It appeared to be like a meteor shower partially hidden by a thickness of cloud. Assuming this to be true, I am afraid the radiant point was hidden by the trees before mentioned. The elevation would be about 15° . Perhaps some of your readers more favourably situated may be able to throw further light on the matter.

G. PERCY BAILEY.

Stonyhurst College, Blackburn, October 6.

FALL OF A METEORIC STONE NEAR CRUMLIN (CO. ANTRIM) SEPTEMBER 13.

THE writer of this note visited the scene of the fall of this meteorite yesterday evening, September 20, and learned that it occurred at about 10.30 a.m. (local time) on the date in question. The body is almost 10 lb. in weight and of a more or less irregular outline, and of the usual meteoric appearance. It bears strong evidence of fusion, shines with a metallic lustre on one side and is apparently truncated, a fragment—say about a third—having fractured off in its descent through the atmosphere. There is also a well-marked line or two of fracture still visible. The evidence at present is that it fell quite perpendicularly, there being no trace of slope or inclination in the hole, about 13-15 inches deep,

which it made on striking the soil. Mr. Walker, of Crosshill, on whose holding it fell, says it was quite hot at first, and felt warm for almost an hour afterwards. Of course, a good deal of interest and local curiosity is naturally aroused, the usual query being "Where did it come from?" Possibly the data given above may help to furnish an answer to this question, although hardly yet sufficient to enable an orbit or trajectory to be computed for this—the third meteorite which has fallen in the British Isles within recent years. The occurrence was accompanied by the usual rumblings or detonations, but the estimations of the duration are here, as is usual in other similar instances, untrustworthy.

Crumlin is almost due west from Belfast, distance about 10 miles, lat. $54^\circ 36' N.$, long. $6^\circ 12' W.$

W. H. MILLIGAN.

26 Cooke Street, Belfast, September 21.

[The delay in the publication of Mr. Milligan's letter has resulted from our sending it to Mr. L. Fletcher, F.R.S., who has furnished the following interesting notes upon the meteorite.—Editor, NATURE.]

During the past fortnight it has been stated in various Irish and English newspapers that a meteoric stone had been seen to reach the earth near the village of Crumlin, a few miles distant from Belfast, on Saturday, September 13, when the meeting of the British Association in that city was in mid course.

Such reports of meteoritic falls are by no means infrequent and are almost always based on mere misapprehension of fact; indeed, it is very seldom that a stone believed to be a meteorite is found on critical examination to have any valid claim to a celestial origin. As lately as last week, for instance, a supposed meteorite was sent to the Natural History Museum from Shropshire for inspection, and yet was undoubtedly a product of our own earth.

As twenty-one years had passed away since the fall of a meteoric stone in the British Isles and thirty-seven years since the fall of a meteoric stone in Ireland, to a person in London it seemed more likely that the Crumlin fall was mythical than that a heavenly body should have fallen after so long an interval near to the very city where so many men of science were gathered together; and it seemed in any case to be a matter of certainty that before the news of the fall had reached London the stone must already have passed into the possession of a private, perhaps foreign, collector.

Last week, impressed by the circumstantial character of the reports (especially that sent by Mr. Milligan, of Belfast, for publication in NATURE), and desiring further information, I telegraphed from South Kensington to Mr. Andrew Walker, on whose farm the stone was said to have fallen; in reply he stated that the stone was still in his possession and that it had not been examined by anyone who had made a special study of meteorites. Though in doubt as to the advisability of so long a journey on the basis of such evidence as was at the moment available, I left at once for Crumlin, and was relieved on arrival to find that the journey had not been made in vain; the stone was undoubtedly a true meteorite. That a high degree of excitement had been aroused in the district by the reports of a meteoritic fall will be manifest from the circumstance that during the interview with Mr. Walker no fewer than four different sets of visitors, some in carriages, some on foot, called to see the stone and the place where it had struck the earth; each visitor was allowed to handle the specimen and feel its weight. It was being stated in the village, but Mr. Walker said it was an exaggeration, that as many as 300 people had been to the farm in the course of a single day. Although Mr. Walker had been told by some of his visitors that it would be unlucky for him to part with a gift sent to him direct from heaven, he perceived that the stone would be best preserved elsewhere

than in a farmhouse ; a change of ownership was accordingly effected, and on the following day the stone was safely deposited on the premises of the Natural History Museum, South Kensington.

The particulars of the fall, as given orally to me by Mr. and Mrs. Walker, are as follows :—

At 10.30 a.m. on Saturday, September 13, which was a cloudy morning, W. John Adams, who is in the employment of Mr. Walker at Crosshill farm, was gathering apples from a tree on the edge of the cornfield and near the house ; he was startled by a noise of such a character that he thought it was due to the bursting of the boiler at the mill, which is a mile to the south and is situated near to Crumlin railway-station. Another loud noise, like that of escaping steam, was followed by the sound as of an object striking the ground near by, and a cloud of dust immediately arose above the standing corn at a spot only twenty yards away from where he was at work. Adams ran through the corn towards the cloud of dust and found a hole in the soil ; thereupon he hurried to the farm-yard for a spade, and within a quarter of an hour of the fall had extracted a black, dense stone, which had penetrated the soil to a depth of $1\frac{1}{2}$ feet and had then been stopped by impact against a much larger terrestrial

certain information as to the direction of the line of flight of the meteorite.

As for the stone itself, it weighs 9 lb. $5\frac{1}{2}$ oz. ; it is $7\frac{1}{2}$ inches long, $6\frac{1}{2}$ inches wide and $3\frac{1}{2}$ inches thick. Its form is irregular and distinctly fragmental ; there are nine or ten faces, each of them slightly concave or convex ; the edges are rounded. Five of the faces are similar to each other in character, and, except for minute pittings and projecting points, are smooth ; they show those large concavities which are common on meteoric stones, and have been likened in shape to "thumb-marks" ; the remaining faces are different in aspect and have a low ridge-and-furrow development ; they are doubtless due to fractures during the passage of the stone through the earth's atmosphere, possibly to the break-up at the moment of detonation. A crack going nearly half-way through the meteorite at a distance of an inch from an outer face was probably caused by impact on the larger stone met with in the soil.

The meteorite is virtually completely covered with the characteristic crust which is formed during the passage of such bodies through the air ; the crust is in parts black, in parts brown perhaps owing to the influence of the soil. On the smoother faces already referred to the

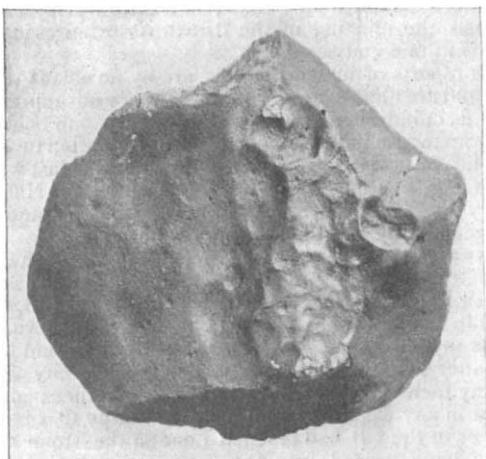


FIG. 1.—The Crumlin meteorite (reduced to one-third the natural size). View showing the smoother faces, the concavities, and the crack probably caused when the meteorite struck a still larger terrestrial stone buried in the soil.



FIG. 2.—The Crumlin meteorite (reduced to one-third the natural size). View showing the two dominant kinds of surface. The face on the right was probably produced by the breakage of the meteorite at an early part of the journey through the earth's atmosphere.

stone. The black stone was hot and, according to Mr. Walker, was still warm to the touch even an hour later. There was a sulphurous odour. Two other men were working at a haystack twenty yards further away from the hole made by the stone and also heard the sounds. Mr. Walker, who is seventy-two years of age, had himself just gone into the house, which is close by, and heard nothing of the explosion. Mrs. Walker told me that she was in the lane on the far side of the house and heard a sound comparable for character with that made by a swarm of bees, though much more intense, or with the rattling noise made by a reaping machine ; she said that others who had heard it had likened the same sound to that of a reaping machine which had run away. It may be mentioned that the sound of a reaping machine is at present very familiar to the observers, for the harvest is in progress. Mr. Walker had heard that the detonation was remarked at Antrim, five miles to the north of Crosshill ; at Legoniell, nine miles to the east ; at Lisburn, eleven miles to the south-east ; and also at Lurgan, thirteen miles south-south-west by south. Mrs. Walker said that some of the hearers had taken the sound to herald the arrival of the Day of Judgment. As yet there is no

crust is thicker than, and different in aspect from, that on the remaining faces. From this it is inferred that the meteorite broke up in the earth's atmosphere at an early part of its course, when the speed was still so enormous that the heat produced by compression of the air in front of the quickly moving stone was sufficient to scorch the newly broken surface, for a fresh fracture of the stone is quite light in colour. In one part the crust is iridescent in purple, blue and pink colours. Here and there bright particles of a metallic alloy of iron and nickel interrupt the continuity of the dark crust. On one of the smaller surfaces of latest fracture there is visible a section of a large flat nodule of the bronze-coloured protosulphide of iron, troilite, which is a characteristic mineral constituent of meteorites and is not found as a native terrestrial product. Owing to the presence of particles of nickel-iron dispersed through the stony matter, the meteorite affects the magnetic needle, though not to a great extent.

A mould of the meteorite has been made from which models will be prepared ; a detailed mineralogical and chemical examination of the material of the stone will be at once begun.

Crosshill is a mile to the north of Crumlin, a small village on the line of railway between Lisburn and Antrim ; it is twelve miles west of Belfast and 3½ miles east of Lough Neagh, a sheet of water thirteen miles long and seven miles wide ; it is thus possible that the remaining fragments of the mass which entered the earth's atmosphere may have fallen into the water. The distance of separation of stones belonging to a single meteoritic fall has not yet been observed to exceed sixteen miles ; it has on several occasions been found to reach ten miles.

The Crumlin meteorite is the largest stone which has been seen to fall from the sky to the British Isles for eighty-nine years, and is larger than any which has fallen in England itself since the year 1795.

L. FLETCHER.

OPENING ADDRESSES AT THE MEDICAL SCHOOLS.

THE first week of October has again brought round the opening of the medical schools, and with it a series of addresses by distinguished members of the profession, in which the first year's man is told something of the calling in which he has elected to earn his livelihood. These addresses are this year perhaps more varied and interesting than usual ; at any rate, even the cursory reader cannot help but be struck with the quantity and the quality of the advice of which the future practitioner has been during the last few days the recipient.

At Owens College, Manchester, the introductory address was delivered by Sir Dyce Duckworth. In it some points of great importance both to teachers, students and the profession at large were considered. In the present state of medical education in London, especially with regard to the development of the medical faculty of the University of London, the remarks of the lecturer under the heading of the standard of general education for medical students cannot escape the observation of those interested in this subject. It is well known that a supposed grievance of the London medical student, which has certainly been well aired, is that although he spends as much money, time and intellect on his medical curriculum as his fellow student at the Scottish universities, he obtains merely a license to practise, whereas the Scottish student receives what is certainly of more value in the eyes of the public, viz. a degree in medicine. Into this question Sir Dyce Duckworth did not enter, but his view seems to be that licenses should not be made more difficult or university degrees easier ; in other words, that the distinction between the two should remain, and that the degree should be regarded as an indication of distinctly higher attainments conferred upon those already holding diplomas. Those interested in the obtaining of an efficient medical staff for the public services are strongly recommended to take to heart the somewhat ominous words of this experienced teacher.

At University College, Sheffield, the opening address was given by Sir Henry Howse, the president of the College of Surgeons. After some remarks pregnant with interest and suggestion upon the scientific training, viz. the biological, chemical and physical training, of the medical student, the lecturer passed on to the part of the curriculum devoted to practical training. Under this latter head, Sir Henry Howse emphasised the most important fact that no disease must be regarded as a textbook entity, but that each as it occurred in each individual patient possessed individual characteristics, and that successful treatment could only be attained by observing and allowing for these characteristics. The great effect of apparently small causes was aptly illus-

trated by the lecturer by showing the difference between a little excess of alkali or acid in the preparation of the liquor ammoniae acetatis of the pharmacopœia.

At the Yorkshire College, Leeds, the opening address was delivered by Mr. Mayo Robson, who took for his subject the advance of surgery during the last thirty years. At the end of the lecture, the author referred to the advances made in medicine and predicted that the progress in the next century would be chiefly medical.

At Guy's Hospital, the opening of the winter session was celebrated on October 1 by a distribution of prizes and medals to the students who were successful last session by the Lord Mayor of London. The Dean read the report of the medical and dental schools and referred to the position of Guy's as a medical school in the reconstituted University of London, expressing a hope that the altered regulations for the matriculation examination would enable a larger number of London students to obtain the doctor of medicine degree.

The London Hospital Medical College opened its 118th session with an old students' dinner on October 1. In a long speech, the chairman of the hospital referred to the great size and enormous work the hospital was doing both in relieving the sufferings of humanity and in the cause of medical education.

A most interesting address was delivered at the opening of the sixty-first session of the London School of Pharmacy, on October 1, by Prof. W. Palmer Wynne, F.R.S. The subject was the changes which have taken place on what may be called the scientific side of pharmacy during recent years, and especially those in which progress in chemistry has played a part. Prof. Wynne discussed the connection between chemical composition and physiological action, and emphasised the extreme difficulty of reducing the results obtained in this connection to anything approaching law, at the same time admitting the great progress which had been made in this direction.

F. W. T.

NOTES.

WE much regret to see the announcement of the sudden death of Dr. J. H. Gladstone, F.R.S., in his seventy-sixth year.

MR. J. ALLEN HOWE has been appointed curator and librarian of the Museum of Practical Geology in succession to Mr. F. W. Rudler, who, as mentioned in our last number, has retired.

THE zoological, botanical and geological collections of Dr. Sven Hedin have, it is stated, been presented by the explorer to the University of Stockholm.

THE death is announced, at the age of sixty-one, of Dr. Julius Ziegler, who for nearly thirty years was at the head of the meteorological department of the Frankfort Physikalische Verein.

THE next annual congress of the Royal Institute of Public Health is to take place in Liverpool in, probably, the third week of July next.

AT the Royal Microscopical Society on October 15, a demonstration on "Rock Changes in Nature's Laboratory" will be given by Prof. T. G. Bonney, F.R.S.

REPORTS of the following earthquakes have appeared in the *Times* during the past few days :—Advices from Guam state that 180 shocks of earthquake were felt in that island on September 25. The marine barracks and other buildings at Agana were destroyed.—Three violent earthquake shocks were felt at Tiflis at 2.30 a.m. on Saturday last, October 4.—A severe earthquake, lasting two minutes, was felt at New Marghilan, Ferghana, on Monday afternoon, October 6.